magnet and rotating armature. Fig. 4 is a diagram illustrating the peculiar configuration of the polar faces and the relation of the armature conductor or conductors thereto.

In Figs. 1 and 2, A A designate two cylindrical castings provided with bracket-arms B B, in which latter are bushings C for the rotating shaft. The conductor in which the currents are induced may be constructed or arranged in various ways; but I prefer to form it in the following manner: I take an annular plate of copper D and by means of a saw or other cutting-tool cut in it radial slots from one edge nearly through to the other, beginning alternately from opposite edges. In this way a continuous zigzag conductor is formed. To the inner edge of this plate are secured two rings of non-magnetic metal E, which are insulated from the copper conductor, but held firmly thereto, as by means of bolts F. Within the rings E is then placed an annular coil G, which is the energizing-coil for the field-magnet. The conductor D and the parts attached thereto are supported by means of the cylindrical shell or casting A A, the two parts of which are brought together and clamped by bolts F′ to the outer edge of the conductor D. The conductor D is also insulated from the shell A.

The core for the field-magnet is built up of two circular parts H H, formed with annular grooves I, which, when the two parts are brought together, form a space for the reception of the energizing-coil G. The central parts or hubs of the cores H H are trued off, so as to fit closely against one another, while the outer portions or flanges which form the polar faces J J are reduced somewhat in thickness to make room for the conductor D, and are serrated on their faces or provided in any other convenient way with polar projections. The two parts of the core H H are mounted on and fixed to the shaft K, and are bound together by bolts L. The number of serrations in the polar faces is arbitrary; but there must exist between them and the radial portions of the conductor D a certain relation, which will be understood by reference to Fig. 4, in which N N represent the projections or points on one face of the core of the field, and S S the points of the other face. The conductor D is shown in this figure in section, *a a′* designating the radial portions of the conductor, and *b* the insulating-divisions between the same. The relative width of the parts *a a′* and the space between any two adjacent points N N or S S is such that when the radial portions *a* of the conductor are passing between the opposite points N S, where the field is strongest, the intermediate radial portions *a′* are passing through the widest spaces midway between such points and where the field is weakest. Since the core on one side is of opposite polarity to the part facing it, all the points or projections of one polar face will be of opposite polarity to those of the other face. Hence, although the space between any two adjacent points on the same face may be extremely small, there will be no leakage of the magnetic lines between any two points of the same name; but the lines of force will pass across from one set of points to the other. The construction followed obviates to a great degree the distortion of the magnetic lines by the action of the current in the conductor D, in which it will be observed the current is flowing at any given time from the center toward the periphery in one set of radial parts *a* and in the opposite direction in the adjacent parts *a′*.

In order to connect the energizing-coil G with a source of continuous current, I have found it convenient to utilize two adjacent radial portions of the conductor D for connecting the terminals of the coil G with two binding-posts M. For this purpose the plate D is cut entirely through, as shown, and the break thus made is bridged over by a short conductor *c*.

At any convenient point the plate D is cut through to form two terminals *d*, which are connected to binding-posts N.

The core H H, when rotated by the driving-pulley P, generates in the conductors D an alternating current, which is taken off from the binding-posts N. It will be observed that from the nature of the construction described this machine is capable of producing an alternating current of an enormously high rate of alternations.

When it is desired to rotate the conductor between the faces of a stationary field-magnet, I adopt the construction shown in Fig. 3. The conductor D in this case is or may be made in substantially the same manner as above described by slotting an annular conducting-plate and supporting it between two heads O, held together by bolts *o* and fixed to the driving-shaft K. The inner edge of the plate or conductor D is preferably flanged to secure a firmer union between it and the heads O. It is insulated from said head. The field-magnet in this case consists of two annular parts H H, provided with annular grooves I for the reception of the coils. The flanges or faces surrounding the annular groove are brought together, while the inner flanges are serrated, as in the previous case, and form the polar faces. The two parts H H are formed with a base R, upon which the machine rests.

S S are non-magnetic bushings secured or set in the central opening of the cores.

The conductor D is cut entirely through at one point to form terminals, from which insulated conductors T are led through the shaft to collecting-rings V.

What I claim is—

1. The combination, in an annular field of force formed by opposing polar faces with radial grooves or serrations and with said poles, of a connected series of radial conductors so disposed with relation to the serrations that while one portion of the radial conduct-